



**INDUSTRIAL COMPUTER SOURCE®**

## **Model 16REL Product Manual**

**MANUAL NUMBER : 00750-109-14B**



**INDUSTRIAL COMPUTER SOURCE®**



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## FORWARD

This product manual provides information to install, operate and or program the referenced product(s) manufactured or distributed by Industrial Computer Source. The following pages contain information regarding the warranty and repair policies.

Technical assistance is available at: **1-800-480-0044**.

**Manual Errors, Omissions and Bugs:** A "Bug Sheet" is included as the last page of this manual. Please use the "Bug Sheet" if you experience any problems with the manual that requires correction.

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## Guarantee

A thirty day money-back guarantee is provided on all **standard** products sold. **Special order products** are covered by our Limited Warranty, *however they may not be returned for refund or credit*. *EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement only. Extended Warranty available. Consult factory.*

## Refunds

In order to receive refund on a product purchase price, the product must not have been damaged by the customer or by the common carrier chosen by the customer to return the goods, and the product must be returned complete (meaning all manuals, software, cables, etc.) within 30 days of receipt and in as-new and resalable condition. The **Return Procedure** must be followed to assure prompt refund.

## Restocking Charges

Product returned *after* 30 days, and *before* 90 days, of the purchase will be subject to a **minimum** 20% restocking charge and any charges for damaged or missing parts.

Products not returned within 90 days of purchase, or products which are not in as-new and resalable condition, are not eligible for credit return and will be returned to the customer.

## Limited Warranty

One year limited warranty on all products sold with the exception of the "Performance Series" I/O products, which are warranted to the original purchaser, for as long as they own the product, subject to all other conditions below, including those regarding neglect, misuse and acts of God. Within one year of purchase, Industrial Computer Source will repair or replace, at our option, any defective product. At any time after one year, we will repair or replace, at our option, any defective "Performance Series" I/O product sold. This does not include products damaged in shipment, or damaged through customer neglect or misuse. Industrial Computer Source will service the warranty for all standard catalog products for the first year from the date of shipment. After the first year, for products not manufactured by Industrial Computer Source, the remainder of the manufacturer's warranty, if any, will be serviced by the manufacturer directly.

The **Return Procedure** must be followed to assure repair or replacement. Industrial Computer Source will normally return your replacement or repaired item via UPS Blue. *Overnight delivery or delivery via other carriers is available at additional charge.*

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Industrial Computer Source or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Industrial Computer Source or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the owners' manual.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. Industrial Computer Source reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.



**Shipments not in compliance with this Guarantee and Limited Warranty Return Policy will not be accepted by Industrial Computer Source.**



## Return Procedure

For any Limited Warranty or Guarantee return, please contact Industrial Computer Source's Customer Service at **1-800-480-0044** and obtain a Return Material Authorization (RMA) Number. All product(s) returned to Industrial Computer Source for service or credit **must** be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items **must** be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty **must** include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing date of purchase.

To reduce risk of damage, returns of product must be in an Industrial Computer Source shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Industrial Computer Source Customer Service at a nominal cost.

## Limitation of Liability

In no event shall Industrial Computer Source be liable for any defect in hardware or software or loss or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Industrial Computer Source liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Industrial Computer Source or its authorized agent.

Some *Sales Items* and *Customized Systems* are **not** subject to the guarantee and limited warranty. However in these instances, any deviations will be disclosed prior to sales and noted in the original invoice. ***Industrial Computer Source reserves the right to refuse returns or credits on software or special order items.***

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### **CE Declaration of Conformity**

**Current Revision 14B**

**September 1997**

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# Chapter 1: Installation

**Note:** Set the address and jumper options before installation

The 16REL relay output board can be installed in any of the PC expansion slots. Remove the PC case, remove the blank metal slot cover, and insert the board. Replace the screw, replace the cover, and you are done.

## Address Selection

The 16REL relay output board occupies a total of two consecutive I/O locations. A dip switch is used to set the base address for these locations. Be careful when selecting the base address as some selections conflict with existing PC ports. The following table shows several examples that usually do not cause a conflict.

ADDRESS		BINARY	SWITCH POSITION SETTING							
-----		A9-----A0	1---	2----	3---	4---	5---	6-	7---	8-
1.	282-283	10 1000 001X	OFF	ON	OFF	ON	ON	ON	ON	ON
2.	286-287	10 1000 011X	OFF	ON	OFF	ON	OFF	ON	ON	OFF
3.	38A-38B	11 1000 101X	OFF	OFF	OFF	ON	ON	ON	OFF	ON
4.	3A2-3A3	11 1010 001X	OFF	OFF	OFF	ON	OFF	ON	ON	ON
5.	3A6-3A7	11 1010 011X	OFF	OFF	OFF	ON	OFF	ON	ON	OFF
6.	302-303	11 0000 001X	OFF	OFF	ON	ON	ON	ON	ON	ON
7.	306-307	11 0000 011X	OFF	OFF	ON	ON	ON	ON	ON	OFF
8.	2EA-2EB	10 1110 101X	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
9.	2EE-2EF	10 1110 111X	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
10.	322-323	11 0010 001X	OFF	OFF	ON	ON	OFF	ON	ON	ON

The following table shows the correlation between the dip switch setting and the address bits used to determine the base address. Assume 302 hex to 303 hex is the desired base address. 302 hex=1100 00XX in binary.

**\*\* NOTE THAT ADDRESS LINE A1 IS ALWAYS A "1".**

SWITCH POSITION	ADDRESS LINE	BINARY	SWITCH SETTING
1	A9	1	OFF
2	A8	1	OFF
3	A7	0	ON
4	A6	0	ON
5	A5	0	ON
6	A4	0	ON
7	A3	0	ON
8	A2	0	ON

---

**NOTE:**

Setting the switch ON or CLOSED corresponds to a "0" in the address while leaving the switch OFF or OPEN corresponds to a "1"

---

## Chapter 2: Technical Description

The 16REL relay output board provides two parallel output ports. The ports are organized as ports A and B and are reed relay output ports. See the table below.

BASE ADDRESS:	300 HEX 768 DECIMAL	FUNCTION
-----		
PORT A ADDRESS:	302 HEX 770 DECIMAL	OUTPUT PORT
PORT B ADDRESS:	303 HEX 771 DECIMAL	OUTPUT PORT

Please note that ports A and B are output ports with read-back capability, meaning that they can be written (output) to and then read back as inputs. Whatever was written will always be read back (binary complement). This allows for bits to be set or reset without altering the state of the other port bits.



## Relay Output Circuit Description

The output ports on the 16REL relay output are connected to 16 dip reed relays. Reed relays provide very high quality, long life, low current (10 watt maximum), dry contact switch closures. Reed relays are not suited for high current applications, and can be destroyed by inductive load switching, where a spark occurs across the contacts internally. The relays are normally open, and close when energized. Each relay can be individually energized by writing a "1" to the proper port bit. The table below shows which bit controls which relay:

### DB-37PMALE CONNECTOR

PORT BIT	RELAY K-#	PINNUMBERS
PORT A BIT	0	K13 P2-2/20
	1	K14 3/21
	2	K15 4/22
	3	K16 5/23
	4	K9 6/24
	5	K10 7/25
	6	K11 8/26
	7	K12 9/27
PORT B BIT	0	K1 P2-10/28
	1	K2 11/29
	2	K3 12/30
	3	K4 13/31
	4	K5 14/32
	5	K6 15/33
	6	K7 16/34
	7	K8 17/35
	GROUND	P2-18,36,37
	+ 5 VOLTS	P2-19
	+ 12 VOLTS	P2-1

## Programming Example

---

To set the 4th relay on port A (K16), write a "1" in bit position 3, to port address base+2, or 302 hex.

```
MOV DX,302H          ;SET DX TO PORT A
MOV AL,0000 1000B    ;SET BIT 3 TO A "1"
OUT DX,AL
```

Another method that takes into account the read-back capability of the output ports A and B:

```
MOV DX,302H          ;SET DX TO PORT A
IN AL,DX              ;GET OLD PORT SETTING
NOT AL                ;INVERT FOR NEGATIVE LOGIC
OR AL,0000 1000B     ;OR IN BIT 3
OUT DX,AL              ;SET BIT 3 W/O ALTERING OTHER BITS
```

---

### NOTE:

Reading back the port ( A and B ) results in the binary complement of the original output

---

## How to remain CE Compliant

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In order for machines to remain CE compliant, only CE compliant parts may be used. To keep a chassis compliant it must contain only compliant cards, and for cards to remain compliant they must be used in compliant chassis. Any modifications made to the equipment may affect the CE compliance standards and should not be done unless approved in writing by Industrial Computer Source.

The Model 16REL is designed to be CE Compliant when used in an CE compliant chassis. Maintaining CE Compliance also requires proper cabling and termination techniques. The user is advised to follow proper cabling techniques from sensor to interface to ensure a complete CE Compliant system. Industrial Computer Source does not offer engineering services for designing cabling or termination systems. Although Industrial Computer Source offers accessory cables and termination panels, it is the user's responsibility to ensure they are installed with proper shielding to maintain CE Compliance.



# *Declaration of Conformity*



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Industrial Computer Source declares under its own and full responsibility that the following products are compliant with the protection requirements of the 89/336/EEC directives.

**Only specific models listed on this declaration and labeled with the CE logo are CE compliant.**

**16REL**

Conformity is accomplished by meeting the requirements of the following European harmonized standards:

<b>EN 50082-1:1992</b>	EMC Generic Immunity Standard
<b>EN 55022:1987</b>	Limits & Methods of measurement of interference characteristics of IT Equipment
<b>EN 60 950</b>	Safety of Information Technology Equipment Including Electrical Business Equipment

Information supporting this declaration is contained in the applicable Technical Construction file available from:

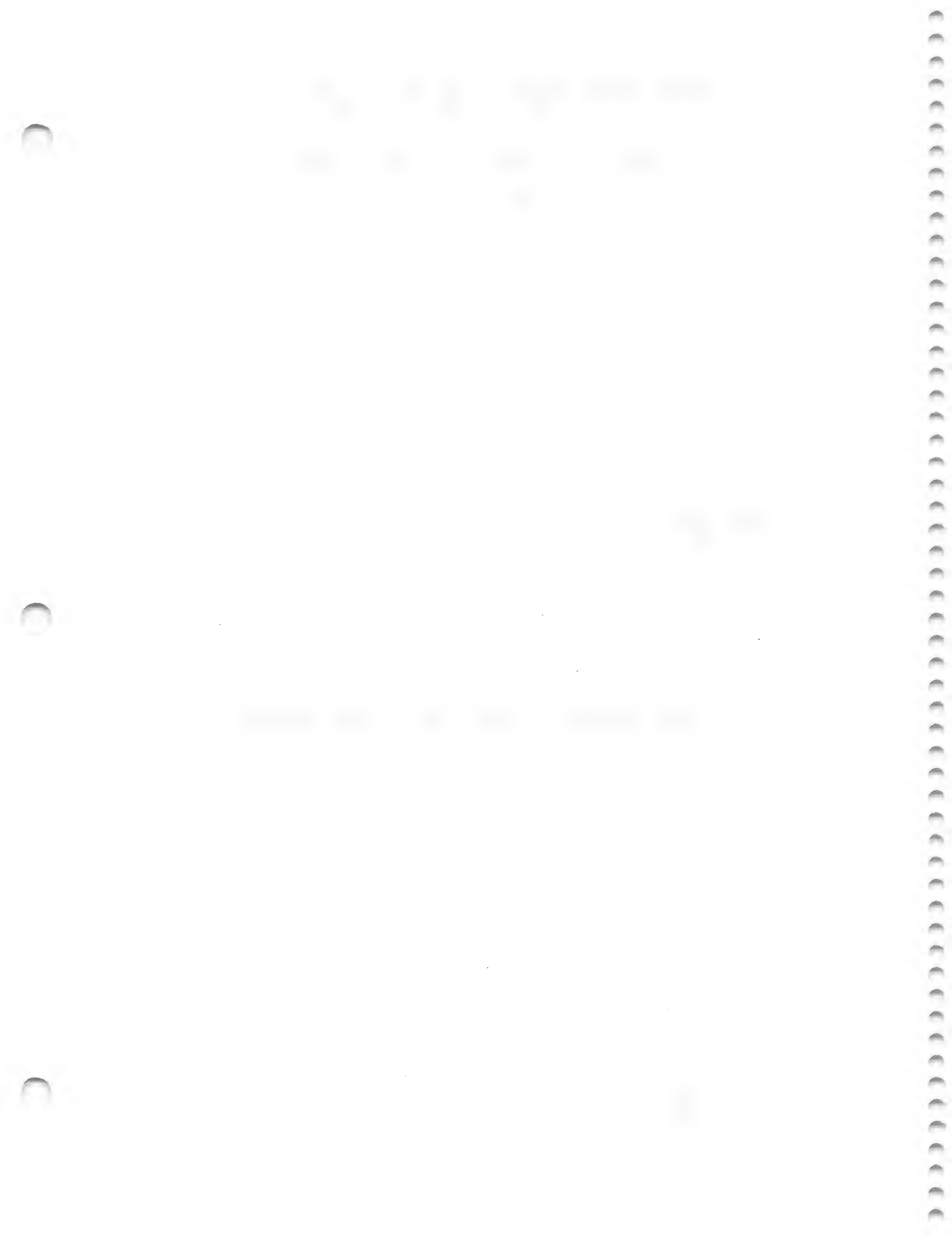


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September 15, 1997  
San Diego, CA



## BUG REPORT

While we have tried to assure this manual is error free, it is a fact of life that works of man have errors. We request you to detail any errors you find on this BUG REPORT and return it to us. We will correct the errors/problems and send you a new manual as soon as available. Please return to:



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Product: **16REL**

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Please list the page numbers and errors found. Thank you!





